THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

ECD 2225 – System Software

Final Examination – 2005 / 2006 (*Closed Book Type*)

Date : 27th of April, 2006 Time : 09:30 – 12:30

INSTRUCTIONS TO CANDIDATES
Answer any five questions. All questions carry equal mark.

1. (a) Consider a word processing compiler. Briefly describe the functions of the main modules of this compiler. [15 marks]

   (b) Indicate which tokens will be used by this compiler. Provide at least two examples for each. [5 marks]

2. (a) Give examples (at least two) for the file categories found in Unix system? (Provide short description of the file categories also.) [6 marks]

   (b) Assume that you have opened an existing text file and wrote something into it. Then finished your task and went to have a cup of tea. What kind of file primitives would have been activated if you were working in Unix environment? Describe those primitives briefly. [8 marks]

   (c) Describe the disk structure in the Unix system. [6 marks]

3. (a) Consider the scenario given in table 2, where "P" indicates a process and "R" indicated a resource.

Time	Action
1	P2 requests and is allocated R2
2	P4 requests and is allocated R4
3	P2 requests and is allocated R1
4	P3 requests R1
5	P1 requests and is allocated R3
6	P4 requests R3
7	P2 releases R1, which is allocated to P3
8	P3 requests R3
9	P1 releases R3, which is allocate to P4
12	P4 releases R3, which is allocated to P3

Use Holt's deadlocks modeling method (the same used in your text book) to analyze the above scenario. Is there a deadlock in the system above? [10 marks]

(b) Consider the situation given above in 3.(a). Name the situations when the system wa critical condition and indicate what kind of action occurring next in the system co have created a deadlock situation. [10 mar

4. (a) Compare multi-processing organized on single processor and parallel processors. W are their objectives? [10 mar

(b) Consider following set of processes given in table 1, with the length of the CPU-b time given in milliseconds.

Job	Arrival Time	CPU-Burst Time	Priority
A	0	5	6
B	0	8	1
C	1	4	4
D	1	3	5
E	2	7	3
F	4	2	7
G	6	1	2

A smaller priority number implies a higher priority. Draw four Gantt charts that illust the execution of these processes using First Come First Served, Shortest Job Nex Non-preemptive Priority, and Round Robin scheduling. Choose proper quantum size Round Robin scheduling and clearly state your assumptions. [10 mar

5. Assume you are going to build a file manager to handle only picture documents on computer. Note that some other file manager is handling all other files running on system.

(a) What would be your objectives? [5 mar

(b) How will your file manager organize disc space allocation? State all the assumption will make. What are the advantages and disadvantages of that disc space alloca method? [8 mar

(c) What kind of information should your file manager note down about the files it store? [7 mar

6. (a) Consider company which has a network of air travel ticketing agencies around country. What kind of deadlock situations can occur there? Briefly describe how occur. [10 m

(b) Suggest a method to avoid deadlock situations you mentioned above. [10 m

7. (a) Consider weather department office. If the whole system is computerized, suggest the architecture of the virtual memory organization to enable efficient functioning of the division. [10 marks]

(b) Suggest at least two page replacement strategies for the above system. Discuss their advantages and disadvantages. Choose the best page replacement algorithm. Justify your choice. (Note: the page replacement algorithms must logically be appropriate for the above system.) [10 marks]

8. (a) Assume you are asked to network OPD division at Kandy Hospital. The doctors would like to provide each patient with medical record to keep track of patient's illnesses and be able to predict in time the kind of illnesses a patient might develop. Also this system should warn the doctors of any possible epidemics in the area.

All medical records will be kept on a server and each doctor's office will be provided with a computer. This way the patient has only to provide his NIC and doctors will be able to get all his medical records immediately online.

Evaluate this system from the point of view of security. What kind of information should be accessed by authorized personnel only and why? Please write your answers in :: point form (very briefly). [7 marks]

(b) What kind of security breaches possible in such system? Suggest counter measures. [7 marks]

(c) What ethic violations might take place in this system and by whom? [6 marks]